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IDENTIFICATION AND CHARACTERIZATION OF *Enterocytozoon bieneusi* ISOLATES FROM THE PROTO-MALAY AND SENOI TRIBES IN SUNGAI LEMBING, PAHANG

By

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DECLARATION

"I hereby declare that this thesis is my original work and has not been submitted previously or currently for any other degree at UiTM or any other institutions."

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ABSTRACT

Enterocytozoon bieneusi is most common of microsporidian species that infects many types of cells including human and animals. These organisms are causing long lasting diarrhea primarily in immunocompromised patients but microsporidiosis is also higher in immunocompetent individuals. The previous study of microsporidial infection is mostly focused on immunodeficiency or immunosuppressive individuals. Information regarding microsporidial infections among immunocompetent individuals is lacking. Hence, this cross sectional study was carried out to determine prevalence of *E. bieneusi* infection and to find out the occurrence of *E. bieneusi* according to age group and gender among the Proto-Malay and Senoi tribes in Sungai Lembing, Pahang, Malaysia. Stool samples were collected from 209 voluntary participants; 96 males and 113 females that aged between one to 85 years old. Demographic data, socioeconomic, environmental, and behavioral information was collected by using pre-tested questionnaire. Overall prevalence of *E. bieneusi* infection was 3.83 % (8/209). From the observation, majority of individual infected with *E. bieneusi* was male (8.33 %) can be observed in those aged ≥15 years old. These samples were detected Small Subunit rDNA gene by using Polymerase chain reaction amplification with specific primer EBIEF1 and EBIER1, as demonstrated by an amplicon of 607-bp. This is the first report of *E. bieneusi* in Malaysia. It is hoped that these findings will allow greater emphasis from public health authrities through public education on personal hygiene and the consumption of boiled or filtered water in order to reduce the infection.

CHAPTER 1
INTRODUCTION

Microsporidia are known as single celled (Gill, 2007) which able to infect all major groups of animal kingdoms, including invertebrates, fish, amphibians, reptiles, birds and mammals (Wittner & Weiss, 1999). This organism is obligate intracellular protozoa which poison to many types of cell (Didier *et al.*, 2000, 2004; Weber *et al.*, 2000). A study by Lono *et al* (2010) found microsporidia have been reported in HIV patients, which recognized as opportunistic infection because they are involved as agents of human disease, especially in immunosuppressed individuals such as organ transplantation and chemotherapy recipients. Microsporidiosis is also can found in immunocompromised population and produce systemic and non-systemic disease (Garcia *et al.*, 1994; Kotler & Orenstein, 1998). The HIV positive patient population is more susceptible to intestinal parasitic infection than others patient populations, it has been estimated that 7-50% of chronic diarrhea in AIDS patients is associated with microsporidia. There is a wide spectrum of clinical manifest microsporidiosis including arthritis, prostatic abscess, tongue ulcer, bone infection, cutaneous infection, gastrointestinal and ocular infections (Franzen & Muller, 2001). The common clinical features of microsporidia infection usually produce persistent diarrhea and weight loss which associated with AIDS. In addition, AIDS patient is the main risk of microsporidia, but have another increasingly reported such as in organ transplant recipient, travellers, the chronically ill, the elderly, children and healthy people. Furthermore, this infection can lead to death (Weber *et al.*, 1997).

There are eight genera of microsporidia which is ability to infect human. From eight different genera of these organisms, majority species causes of human infection are either *Enterocytozoon bieneusi* or